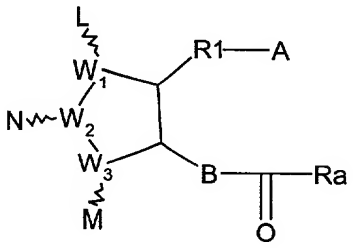
WHAT IS CLAIMED IS

1. A method for opening potassium channels in the cell membranes of a mammal in need of such treatment comprising administering to the mammal an effective amount of a compound with the formula:



wherein W1, W2 and W3 are carbon or oxygen atoms,

L, M and N are a hydrogen atom, hydroxy, halogen atom, lower alkyl, lower alkoxy, hydroxy(lower)alkyl, or oxo, wherein at least one of L and M is a group other than hydrogen, and the five-membered ring may have at least one double bond;

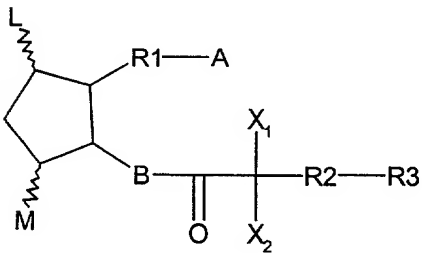
A is $-CH_2OH$, $-COCH_2OH$, -COOH or a functional derivative thereof;

B is single bond, $-CH_2-$, $-CH_2-CH_2-$, -CH=CH-, $-C\equiv C-$, $-CH_2-CH_2-CH_2-$, $-CH=CH-CH_2-$, $-CH_2-CH=CH-$, $-C\equiv C-CH_2-$, or $-CH_2-C\equiv C-$;

R1 is a saturated or unsaturated bivalent lower or medium aliphatic hydrocarbon residue, which is unsubstituted or substituted with halogen, an alkyl group, hydroxy, oxo, aryl or heterocyclic group ; and

Ra is cyclo(lower)alkyl, cyclo(lower)alkyloxy, aryl, aryloxy, a heterocyclic group, a heterocyclic-oxy group, or a saturated or unsaturated lower or medium aliphatic hydrocarbon residue which is unsubstituted or substituted with halogen, oxo, hydroxy, lower alkyl, lower alkoxy, lower alkanoyloxy, cyclo(lower)alkyl, cyclo(lower)alkyloxy, aryl, aryloxy, a heterocyclic group, or a heterocyclic-oxy group.

2. A method for opening potassium channels in the cell membranes of a mammal in need of such treatment comprising administering to the mammal an effective amount of a compound with the formula:



wherein L, and M are a hydrogen atom, hydroxy, halogen atom, lower alkyl, lower alkoxy, hydroxy(lower)alkyl, or oxo, wherein at least one of L and M is a group other than hydrogen, and the five-membered ring may have at least one double bond;

A is $-CH_2OH$, $-COCH_2OH$, -COOH or a functional derivative thereof;

B is single bond, $-CH_2-$, $-CH_2-CH_2-$, -CH=CH-, $-C\equiv C-$, $-CH_2-CH_2-CH_2-$, $-CH=CH-CH_2-$, $-CH_2-CH=CH-$, $-C\equiv C-CH_2-$, or -CH2-C≡C-;

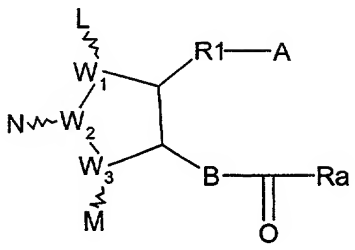
R1 is a saturated or unsaturated bivalent lower or medium aliphatic hydrocarbon residue, which is unsubstituted or substituted with halogen, an alkyl group, hydroxy, oxo, aryl or a heterocyclic group ; and

X1 and X2 are hydrogen, lower alkyl, or halogen;

R2 is a single bond or lower alkylene; and

R3 is lower alkyl, lower alkoxy, cyclo(lower)alkyl, cyclo(lower)alkyloxy, aryl, aryloxy, a heterocyclic group or a heterocyclic-oxy group.

3. A method for maintaining or inducing hyperpolarization in the cell membranes of a mammal in need of such treatment which comprises administering to the mammal an effective amount of a compound with the formula:



wherein W1, W2 and W3 are carbon or oxygen atoms,

L, M and N are a hydrogen atom, hydroxy, halogen atom, lower alkyl, lower alkoxy, hydroxy(lower)alkyl, or oxo, wherein at least one of L and M is a group other than hydrogen, and the five-membered ring may have at least one double bond;

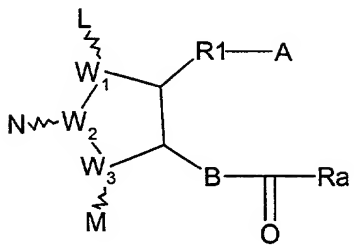
A is $-CH_2OH$, $-COCH_2OH$, -COOH or a functional derivative thereof;

B is single bond, $-CH_2-$, $-CH_2-CH_2-$, -CH=CH-, $-C\equiv C-$, $-CH_2-CH_2-CH_2-$, $-CH=CH-CH_2-$, $-CH_2-CH=CH-$, $-C\equiv C-CH_2-$, or $-CH_2-C\equiv C-$;

R1 is a saturated or unsaturated bivalent lower or medium aliphatic hydrocarbon residue, which is unsubstituted or substituted with halogen, an alkyl group, hydroxy, oxo, aryl or heterocyclic group ; and

Ra is cyclo(lower)alkyl, cyclo(lower)alkyloxy, aryl, aryloxy, a heterocyclic group, a heterocyclic-oxy group, or a saturated or unsaturated lower or medium aliphatic hydrocarbon residue which is unsubstituted or substituted with halogen, oxo, hydroxy, lower alkyl, lower alkoxy, lower alkanoyloxy, cyclo(lower)alkyl, cyclo(lower)alkyloxy, aryl, aryloxy, a heterocyclic group, or a heterocyclic-oxy group.

4. A method for treating conditions and disease states characterized by excessive cell membrane depolarization which comprises administering to the mammal an effective amount of a compound with the formula:



wherein W1, W2 and W3 are carbon or oxygen atoms,

L, M and N are a hydrogen atom, hydroxy, halogen atom, lower alkyl, lower alkoxy, hydroxy(lower)alkyl, or oxo, wherein at least one of L and M is a group other than hydrogen, and the five-membered ring may have at least one double bond;

A is $-CH_2OH$, $-COCH_2OH$, -COOH or a functional derivative thereof;

B is single bond, $-CH_2-$, $-CH_2-CH_2-$, -CH=CH-, $-C\equiv C-$, $-CH_2-CH_2-CH_2-$, $-CH=CH-CH_2-$, $-CH_2-CH=CH-$, $-C\equiv C-CH_2-$, or $-CH_2-C\equiv C-$;

R1 is a saturated or unsaturated bivalent lower or medium aliphatic hydrocarbon residue, which is unsubstituted or substituted with halogen, an alkyl group, hydroxy, oxo, aryl or heterocyclic group ; and

Ra is cyclo(lower)alkyl, cyclo(lower)alkyloxy, aryl, aryloxy, a heterocyclic group, a heterocyclic-oxy group, or a saturated or unsaturated lower or medium aliphatic hydrocarbon residue which is unsubstituted or substituted with halogen, oxo, hydroxy, lower alkyl, lower alkoxy, lower alkanoyloxy, cyclo(lower)alkyl, cyclo(lower)alkyloxy, aryl, aryloxy, a heterocyclic group, or a heterocyclic-oxy group.

5. The method of claim 1, wherein said compound is unoprostone isopropyl.

6. The method of claim 2, wherein said compound is unoprostone isopropyl.

7. The method of claim 3, wherein said compound is unoprostone isopropyl.

8. The method of claim 4, wherein said compound is unoprostone isopropyl.

9. The method of claim 1, wherein said condition or disease state is hypertension, pulmonary hypertension, asthma, interstitial cystitis, urinary incontinence and other urogenital disorders, ischemic bowel disease, gastrointestinal motility disorders, arrhythmias, peripheral vascular disease, congestive heart failure, dysmenorrhea, angina, or alopecia.

10. The method of claim 2, wherein said condition or disease state is hypertension, pulmonary hypertension, asthma, interstitial cystitis, urinary incontinence and other urogenital disorders, ischemic bowel disease, gastrointestinal motility disorders, arrhythmias, peripheral vascular disease, congestive heart failure, dysmenorrhea, angina, or alopecia.

11. The method of claim 3, wherein said condition or disease state is hypertension, pulmonary hypertension, asthma, interstitial cystitis, urinary incontinence and other urogenital disorders, ischemic bowel disease, gastrointestinal motility disorders, arrhythmias, peripheral vascular disease, congestive heart failure, dysmenorrhea, angina, or alopecia.

12. The method of claim 4, wherein said condition or disease state is hypertension, pulmonary hypertension, asthma, interstitial cystitis, urinary incontinence and other urogenital disorders, ischemic bowel disease, gastrointestinal motility disorders, arrhythmias, peripheral vascular disease, congestive heart failure, dysmenorrhea, angina, or alopecia.